4CS016 Embedded Systems Programming Workbook 5

http://www.thingiverse.com/thing:1520159

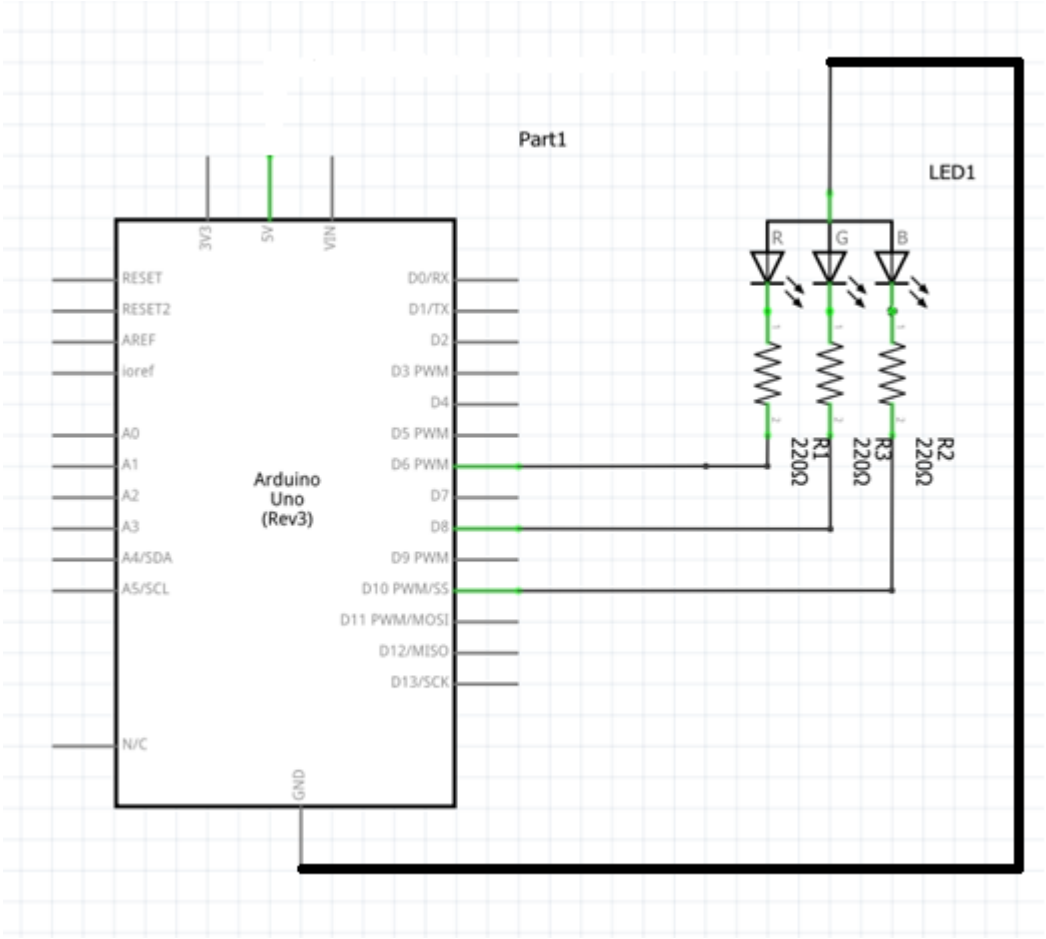
Contents

Introduction

This workbook complements the lectures for 4CS016 as such, the lecture notes will be referred to as the work progresses. You will also need to complete portfolio activities as you progress, these are highlighted as you go along.

Lab 1. RGB LEDs

Step 1. Wire up the RGB LED circuit from the lecture



Step 2: Check that it works ☺

Step 3: Alter the circuit so that each colour is activated by one of 3 switches.

Complete Activity 5.1 of the Portfolio

End of Lab 1

Please continue with Lab 2

Lab 2. Ultrasonic

Step 1: Wire up the Ultrasonic Sensor unit.

Step 2: Alter the circuit so that the Distance is provided as meaningful information in the Serial port, i.e. raw reading, inches, centimetres.

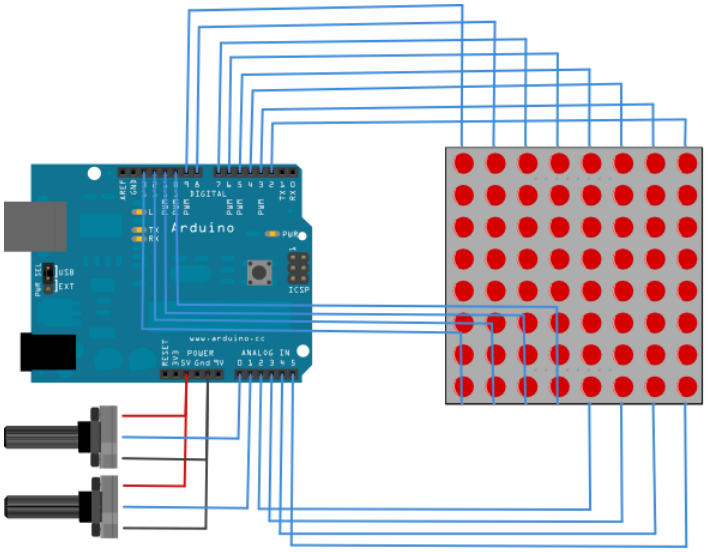
End of Lab 2

Please continue with Lab 3

Lab 3: LED Matrix (Optional)

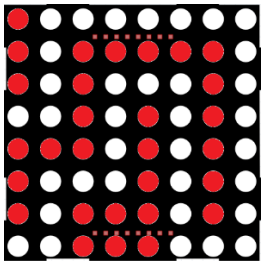
Step 1: If available, wire up the Matrix display from the lecture

And the program from https://www.arduino.cc/en/Tutorial/RowColumnScanning



Step 2: Ensure it works.

Step 3: Remove the potentiometers and instead create a simple maze.



Try not to copy mine, but choose one yourself.

If not available explore the Neo Pixel Ring in TinkerCAD. Do some research to see if you can get it to strobe colours.

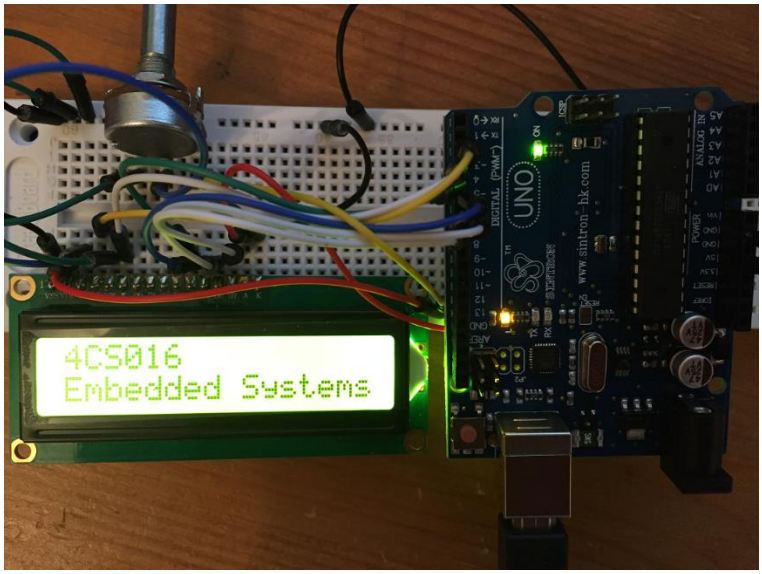
Complete Activity 5.2 of the Portfolio

End of Lab 3

Please continue with Lab 4

Lab 3. LCD Display

Step 1: Wire up the circuit shown in the lecture entitled “Voila”



Step 2: Test it to ensure it works.

Step 3: Amend the program to:

1. Display the Centigrade Temperature including a °C
2. Display the Fahrenheit Temperature.
3. Include your initials and the year as well.
4. Have the display switchable between Fahrenheit & Centigrade via a switch.
5. Use parts of your program from Workbook 4 ☺

Here’s mine.

Complete Activity 5.3 of the Portfolio

End of Lab 4

End of Workbook 5